

# Publication List

## Andreas Läuchli

### Publications

#### *Overview*

I have authored 3 book chapters, 111 refereed journal publications, 2 ALPS collaboration papers and 3 proceedings so far.

My publications currently report 7600/5700/5000 citations with an  $h$ -index of 47/42/38 based on Google Scholar/ADS Abstract Service/Web of Science.

The list of publications including citation information is also available on the ResearcherID web page [B-1930-2008](#) and on [Google Scholar](#).

#### *Book chapters*

- [3] A.M. Läuchli, M. Schuler, and A. Wietek,  
*Studying Continuous Symmetry Breaking with Exact Diagonalization*,  
in "Quantum Materials: Experiments and Theory; Modeling and Simulation, Vol. 6",  
Eds: E. Pavarini, E. Koch, J. van den Brink, and G. Sawatzky  
Verlag des Forschungszentrum Jülich, 2016, ISBN 978-3-95806-159-0 .
- [2] A. Läuchli,  
*Numerical Simulations of Frustrated Systems*,  
in "Introduction to Frustrated Magnetism: Materials, Experiments, Theory",  
Eds: C. Lacroix, P. Mendels, and F. Mila  
Springer Series in Solid-State Sciences, **164**, 481-511 (2011) .
- [1] K. Penc and A. Läuchli,  
*Spin Nematic Phases in Quantum Spin Systems*,  
in "Introduction to Frustrated Magnetism: Materials, Experiments, Theory",  
Eds: C. Lacroix, P. Mendels, and F. Mila  
Springer Series in Solid-State Sciences, **164**, 331-362 (2011).

#### *Refereed journal articles*

- [111] A. Wietek and A. M. Läuchli,  
*Sublattice Coding Algorithm and Distributed Memory Parallelization for Large-Scale Exact Diagonalizations of Quantum Many-Body Systems*,  
Phys. Rev. E **98**, 033309 (2018).
- [110] C. Romen and A. M. Läuchli,  
*Chiral Mott insulators in frustrated Bose-Hubbard models on ladders and two-dimensional lattices: a combined perturbative and density matrix renormalization group study*,  
Phys. Rev. B **98**, 054519 (2018).
- [109] M. Rader and A. M. Läuchli,  
*Finite Correlation Length Scaling in Lorentz-Invariant Gapless iPEPS Wave Functions*,  
Phys. Rev. X **8**, 031030 (2018).
- [108] A. Weichselbaum, S. Capponi, P. Lecheminant, A.M. Tsvelik, and A.M. Läuchli,  
*Unified Phase Diagram of Antiferromagnetic SU(N) Spin Ladders*,  
Phys. Rev. B **98**, 085104 (2018).

## Publications (continued)

- [107] V. Lienhard, S. de Léséleuc, D. Barredo, T. Lahaye, A. Browaeys, M. Schuler, L.-P. Henry, and A.M. Läuchli,  
*Observing the space- and time-dependent growth of correlations in dynamically tuned synthetic Ising antiferromagnets*,  
Phys. Rev. X. **8**, 021070 (2018).  
This paper has been featured in "[Physics](#)".
- [106] M.E. Zayed, C. Rüegg, J. Larrea, A.M. Läuchli, C. Panagopoulos, S.S. Saxena, M. Ellerby, D.F. McMorrow, T. Straessle, S. Klotz, G. Hamel, R.A. Sadykov, V. Pomjakushin, M. Boehm, M. Jimenez-Ruiz, A. Schneidewind, E. Pomjakushina, M. Stingaciu, K. Conder, and H.M. Ronnow,  
*Observation of a 4-spin Plaquette Singlet State in the Shastry-Sutherland compound  $\text{SrCu}_2(\text{BO}_3)_2$* ,  
Nat. Phys. **13**, 962 (2017).
- [105] S. Whitsitt, M. Schuler, L.-P. Henry, A.M. Läuchli, and S. Sachdev,  
*Spectrum of the Wilson-Fisher conformal field theory on the torus*,  
Phys. Rev. B **96**, 035142 (2017).  
This paper has been selected as an "Editor's suggestion".
- [104] C.B. Krimphoff, M. Haque, and A.M. Läuchli,  
*Propagation and jamming dynamics in Heisenberg spin ladders*,  
Phys. Rev. B. **95**, 144308 (2017).
- [103] A. Wietek and A.M. Läuchli,  
*Chiral Spin Liquid and Quantum Criticality in Extended  $S = 1/2$  Heisenberg Models on the Triangular Lattice*,  
Phys. Rev. B. **95**, 035141 (2017).
- [102] M. Schuler, S. Whitsitt, L.-P. Henry, S. Sachdev, and A.M. Läuchli,  
*Universal Signatures of Quantum Critical Points from Finite-Size Torus Spectra: A Window into the Operator Content of Higher-Dimensional Conformal Field Theories*,  
Phys. Rev. Lett. **117**, 210401 (2016).
- [101] P. Nataf, M. Lajkó, A. Wietek, K. Penc, F. Mila, and A.M. Läuchli,  
*Chiral spin liquids in triangular lattice  $SU(N)$  fermionic Mott insulators with artificial gauge fields*,  
Phys. Rev. Lett. **117**, 167202 (2016).
- [100] P. Nataf, M. Lajkó, P. Corboz, A.M. Läuchli, K. Penc, and F. Mila,  
*Plaquette order in the  $SU(6)$  Heisenberg model on the honeycomb lattice*,  
Phys. Rev. B. **93**, 201113(R) (2016).
- [99] A. Wietek, A. Sterdyniak, and A.M. Läuchli,  
*Nature of chiral spin liquids on the kagome lattice*,  
Phys. Rev. B **92**, 125122 (2015).
- [98] S. Capponi and A.M. Läuchli,  
*Phase diagram of interacting spinless fermions on the honeycomb lattice: a comprehensive exact diagonalization study*,  
Phys. Rev. B **92**, 085146 (2015).
- [97] M. Dalmonte, W. Lechner, Zi Cai, M. Mattioli, A.M. Läuchli, and G. Pupillo,  
*Cluster Luttinger liquids and emergent supersymmetric conformal critical points in the one-dimensional soft-shoulder Hubbard model*,  
Phys. Rev. B **92**, 045106 (2015).
- [96] H.J. Changlani and A.M. Läuchli,  
*Trimerized ground state of the spin-1 antiferromagnet on the kagome lattice*,  
Phys. Rev. B **91**, 100407(R) (2015).
- [95] R. Lundgren, J. Blair, M. Greiter, A.M. Läuchli, G.A. Fiete, and R. Thomale,  
*Momentum Space Entanglement Spectrum of Bosons and Fermions with Interactions*,  
Phys. Rev. Lett. **113**, 256404 (2014).

## Publications (continued)

- [94] L. Bonnes, F.H.L. Essler, and A.M. Läuchli,  
*'Light-cone' dynamics after quantum quenches in spin chains*,  
Phys. Rev. Lett. **113**, 187203 (2014).
- [93] P. Calabrese, F.H.L. Essler and A.M. Läuchli,  
*Entanglement Entropies of the quarter filled Hubbard model*,  
J. Stat. Mech. (2014) P09025.
- [92] L. Bonnes, D. Charrier, and A.M. Läuchli,  
*Dynamical and Steady State Properties of a Bose-Hubbard Chain with Bond-Dissipation: A Study based on Matrix Product Operators*,  
Phys. Rev. A **90**, 033612 (2014).
- [91] C.-M. Chung, V. Alba, L. Bonnes, P. Chen, and A.M. Läuchli,  
*Entanglement negativity via replica trick: a Quantum Monte Carlo approach*,  
Phys. Rev. B **90**, 064401 (2014).
- [90] C.-M. Chung, L. Bonnes, P. Chen, and A.M. Läuchli,  
*Entanglement Spectroscopy using Quantum Monte Carlo*,  
Phys. Rev. B **89**, 195147 (2014).
- [89] C.V. Kraus, M. Dalmonte, M.A. Baranov, A.M. Läuchli and P. Zoller,  
*Majorana edge states in two atomic wires coupled by pair-hopping*,  
Phys. Rev. Lett. **111**, 173004 (2013).
- [88] S. Capponi, O. Derzhko, A. Honecker, A.M. Läuchli, and J. Richter,  
*Numerical study of magnetization plateaux in the spin-1/2 kagome Heisenberg antiferromagnet*,  
Phys. Rev. B **88**, 144416 (2013).
- [87] L. Bonnes, H. Pichler and, A.M. Läuchli,  
*An entropy perspective on the thermal crossover in a fermionic Hubbard chain*,  
Phys. Rev. B **88**, 155103 (2013).
- [86] A.M. Läuchli, Z. Liu, E.J. Bergholtz, and R. Moessner,  
*Hierarchy of fractional Chern insulators and competing compressible states*,  
Phys. Rev. Lett. **111**, 126802 (2013).
- [85] V. Alba, M. Haque and A.M. Läuchli,  
*Entanglement spectrum of the two dimensional Bose-Hubbard model*,  
Phys. Rev. Lett. **110**, 260403 (2013).
- [84] B. Hsu, C.R. Laumann, A.M. Läuchli, R. Moessner, and S.L. Sondhi,  
*Approximating random quantum optimization problems*,  
Phys. Rev. A **87**, 062334 (2013).
- [82] H. Pichler, L. Bonnes, A.J. Daley, A.M. Läuchli and P. Zoller,  
*Thermal vs. Entanglement Entropy: A Measurement Protocol for Fermionic Atoms with a Quantum Gas Microscope*,  
New J. Phys. **15**, 063003 (2013).
- [81] P. Corboz, M. Lajkó, K. Penc, F. Mila, and A.M. Läuchli,  
*Competing states in the SU(3) Heisenberg model on the honeycomb lattice: Plaquette valence-bond crystal versus dimerized color-ordered state*,  
Phys. Rev. B **87**, 195113 (2013).
- [80] N.Y. Yao, A.V. Gorshkov, C.R. Laumann, A.M. Läuchli, J. Ye, and M.D. Lukin,  
*Realizing Fractional Chern Insulators with Dipolar Spins*,  
Phys. Rev. Lett. **110**, 185302 (2013).  
This paper has been selected as an "Editor's suggestion" and is featured in a Viewpoint in Physics.

## Publications (continued)

- [79] F.H.L. Essler, A.M. Läuchli, and P. Calabrese,  
*Shell-Filling Effect in the Entanglement Entropies of Spinful Fermions*,  
Phys. Rev. Lett. **110**, 115701 (2013).
- [78] H.J. Changlani, S. Ghosh, C.L. Henley, and A.M. Läuchli,  
*Heisenberg antiferromagnet on Cayley trees: low-energy spectrum and even/odd site imbalance*,  
Phys. Rev. B **87**, 085107 (2013).
- [77] J. Ummethum, J. Schnack, and A.M. Läuchli,  
*Large-scale numerical investigations of the antiferromagnetic Heisenberg icosidodecahedron*,  
Journal of Magnetism and Magnetic Materials **327** 103 (2013).
- [76] H.Y. Yang, A.F. Albuquerque, S. Capponi, A.M. Läuchli and K.P. Schmidt,  
*Effective Spin Couplings in the Mott Insulator of the Honeycomb Lattice Hubbard Model*,  
New J. Phys. **14**, 115027 (2012).
- [75] J. Schliemann and A.M. Läuchli,  
*Entanglement Spectra of Heisenberg Ladders of higher Spin*,  
J. Stat. Mech. (2012) P11021.
- [74] P. Corboz, M. Lajko, A.M. Läuchli, K. Penc, and F. Mila,  
*Spin-orbital quantum liquid on the honeycomb lattice*,  
Phys. Rev. X **2**, 041013 (2012).
- [73] Z. Liu, E.J. Bergholtz, H. Fan and A.M. Läuchli,  
*Fractional topological insulators in flat bands with higher Chern number*,  
Phys. Rev. Lett. **109**, 186805 (2012).
- [72] V. Alba, M. Haque and A.M. Läuchli,  
*Entanglement spectrum of the Heisenberg XXZ chain near the ferromagnetic point*,  
J. Stat. Mech. (2012) P08011.
- [71] P. Corboz, K. Penc, F. Mila, and A.M. Läuchli,  
*Simplex solids in SU(N) Heisenberg models on the kagome and checkerboard lattices*,  
Phys. Rev. B **86**, 041106(R) (2012).
- [70] V. Alba, M. Haque and A.M. Läuchli,  
*Boundary-locality and perturbative structure of entanglement spectra in gapped systems*,  
Phys. Rev. Lett. **108**, 227201 (2012).
- [69] P. Corboz, S. Capponi, A.M. Läuchli, B. Bauer and R. Orus,  
*Comment on "Topological quantum phase transitions of attractive spinless fermions in a honeycomb lattice" by Poletti D. et al.*,  
EPL **98**, 27005 (2012).
- [68] T.A. Tóth, A.M. Läuchli, F. Mila, and K. Penc,  
*Competition between two- and three-sublattice ordering for  $S=1$  spins on the square lattice*,  
Phys. Rev. B **85**, 140403(R) (2012).
- [67] I. Rousochatzakis, A. M. Läuchli, and R. Moessner,  
*Quantum magnetism on the Cairo pentagonal lattice*,  
Phys. Rev. B **85**, 104415 (2012). Editor's suggestion.
- [66] B. Bauer, P. Corboz, A.M. Läuchli, L. Messio, K. Penc, M. Troyer, and F. Mila,  
*Three-sublattice order in the SU(3) Heisenberg model on the square and triangular lattice*,  
Phys. Rev. B **85**, 125116 (2012).
- [65] B. Surer, M. Troyer, P. Werner, T.O. Wehling, A.M. Läuchli, A. Wilhelm, and A.I. Lichtenstein,  
*Multi-orbital Kondo physics of Co in Cu hosts*,  
Phys. Rev. B **85**, 085114 (2012).

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- [64] A.M. Läuchli and J. Schliemann,  
*Entanglement spectra of coupled  $S=1/2$  spin chains in a ladder geometry*,  
Phys. Rev. B **85**, 054403 (2012).
- [63] Z. Liu, E.J. Bergholtz, H. Fan, and A.M. Läuchli,  
*Edge Mode Combinations in the Entanglement Spectra of Non-Abelian Fractional Quantum Hall States on the Torus*,  
Phys. Rev. B **85**, 045119 (2012).
- [62] P. Corboz, A.M. Läuchli, K. Penc, M. Troyer, and F. Mila,  
*Simultaneous dimerization and  $SU(4)$  symmetry breaking of 4-color fermions on the square lattice*,  
Phys. Rev. Lett. **107**, 215301 (2011).
- [61] S. Wenzel and A.M. Läuchli,  
*Monte Carlo study of the critical properties of the three-dimensional 120-degree model*,  
J. Stat. Mech. (2011) P09010.
- [60] A.M. Läuchli, J. Sudan and E.S. Sorensen,  
*Ground-State Energy and Spin Gap of Spin-1/2 Kagome Heisenberg Antiferromagnetic Clusters: Large Scale Exact Diagonalization Results*,  
Phys. Rev. B **83**, 212401 (2011).
- [59] A.F. Albuquerque, D. Schwandt, B. Hetenyi, S. Capponi, M. Mambrini, and A.M. Läuchli,  
*Phase Diagram of a Frustrated Quantum Antiferromagnet on the Honeycomb Lattice: Magnetic Order versus Valence-Bond Crystal formation*,  
Phys. Rev. B **84**, 024406 (2011). Editor's suggestion.
- [58] K.-Y. Yang, Y. Yamashita, A.M. Läuchli, M. Sigrist, and T.M. Rice,  
*Microscopic model for the semiconductor-to-ferromagnetic-metal transition in  $FeSi_{1-x}Ge_x$  Alloys*,  
EPL **95**, 47007 (2011).
- [57] S. Wenzel and A.M. Läuchli,  
*Unveiling the nature of three dimensional orbital ordering transitions: the case of  $e_g$  and  $t_{2g}$  models on the cubic lattice*,  
Phys. Rev. Lett. **106**, 197201 (2011).
- [56] S.R. Manmana, A.M. Läuchli, and F.H.L. Essler, and F. Mila,  
*Phase diagram and continuous pair-unbinding transition of the bilinear-biquadratic  $S=1$  Heisenberg chain in a magnetic field*,  
Phys. Rev. B **83**, 184433 (2011).
- [55] P. Bouillot, C. Kollath, A.M. Läuchli, M. Zvonarev, B. Thielemann, C. Rüegg, E. Orignac, R. Citro, M. Klanjsek, C. Berthier, M. Horvatic and T. Giamarchi,  
*Statics and dynamics of weakly coupled antiferromagnetic spin-1/2 ladders in a magnetic field*,  
Phys. Rev. B **83**, 054407 (2011).
- [54] E.J. Bergholtz, A.M. Läuchli, and R. Moessner,  
*Symmetry-breaking on the three-dimensional hyper-kagome lattice of  $Na_4Ir_3O_8$* ,  
Phys. Rev. Lett. **105**, 237202 (2010).
- [53] T.A. Tóth, A.M. Läuchli, F. Mila, and K. Penc,  
*Three-sublattice ordering of the  $SU(3)$  Heisenberg model of three-flavor fermions on the square and cubic lattices*,  
Phys. Rev. Lett. **105**, 265301 (2010).
- [52] A.A. Tsirlin, I. Rousochatzakis, D. Kasinathan, O. Janson, R. Nath, F. Weickert, C. Geibel, A.M. Läuchli, and H. Rosner,  
*Bridging frustrated-spin-chain and spin-ladder physics: quasi-one-dimensional magnetism of  $BiCu_2PO_6$* ,  
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## Publications (continued)

- [51] H.-Y. Yang, A.M. Läuchli, F. Mila, and K.P. Schmidt,  
*Effective spin model for the spin-liquid phase of the Hubbard model on the triangular lattice*,  
Phys. Rev. Lett. **105**, 267204 (2010).
- [50] C. Kollath, G. Roux, G. Biroli and A.M. Läuchli,  
*Spectral properties of the extended Bose-Hubbard model*,  
J. Stat. Mech. (2010) P08011.
- [49] A.M. Läuchli, E.J. Bergholtz, and M. Haque,  
*Entanglement Scaling of Fractional Quantum Hall states through Geometric Deformations*,  
New J. Phys. **12**, 075004 (2010).
- [48] G. Biroli, C. Kollath and A.M. Läuchli,  
*Effect of Rare Fluctuations on the Thermalization of Isolated Quantum Systems*,  
Phys. Rev. Lett. **105**, 250401 (2010).
- [47] S. Wenzel, W. Janke, and A.M. Läuchli,  
*Revisiting the directional-ordering transition in the compass model with screw-periodic boundary conditions*,  
Phys. Rev. E **81**, 066702 (2010).
- [46] A.M. Läuchli, E.J. Bergholtz, J. Suorsa, and M. Haque,  
*Disentangling Entanglement Spectra of Fractional Quantum Hall States on Torus Geometries*,  
Phys. Rev. Lett. **104**, 156404 (2010).
- [45] C.R. Laumann, A.M. Läuchli, R. Moessner, A. Scardicchio, and S.L. Sondhi,  
*On product, generic and random generic quantum satisfiability*,  
Phys. Rev. A **81**, 062345 (2010).
- [44] A. Läuchli and P. Werner,  
*Krylov-implementation of the hybridization expansion impurity solver and application to 5-orbital models*,  
Phys. Rev. B. **80**, 235117 (2009).
- [43] J. Sudan, A. Lüscher, and A. Läuchli,  
*Emergent multipolar spin correlations in a fluctuating spiral -  
The frustrated ferromagnetic  $S=1/2$  Heisenberg chain in a magnetic field*,  
Phys. Rev. B **80**, 140402(R) (2009), Editor's suggestion.
- [42] R. Schnalle, A. Läuchli, and J. Schnack,  
*Approximate eigenvalue determination of geometrically frustrated magnetic molecules*,  
Condensed Matter Physics **12**, 331 (2009).
- [41] I. Rousochatzakis, S. Manmana, A. Läuchli, B. Normand, and F. Mila,  
*Dzyaloshinskii-Moriya anisotropy and non-magnetic impurities in the  $s = 1/2$  kagome system  $ZnCu_3(OH)_6Cl_2$* ,  
Phys. Rev. B **79**, 214415 (2009).
- [40] A. Lüscher, and A. Läuchli,  
*The antiferromagnetic spin-1/2 Heisenberg model on the square lattice in a magnetic field*,  
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- [39] B. Thielemann, Ch. Rüegg, H. M. Rønnow, A.M. Läuchli, J.-S. Caux, B. Normand, D. Biner, K. W. Krämer, H.-U. Gudel, J. Stahn, K. Habicht, K. Kiefer, M. Boehm, D. F. McMorrow, J. Mesot,  
*Direct Observation of Magnon Fractionalization in the Quantum Spin Ladder*,  
Phys. Rev. Lett. **102**, 107204 (2009).
- [38] I. Rousochatzakis, A. Läuchli, F. Borsa, and M. Luban,  
*Theory of slowing down effect in antiferromagnetic wheels*,  
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- [37] B. Thielemann, Ch. Rüegg, K. Kiefer, H.M. Rønnow, P. Bouillot, C. Kollath, E. Orignac, R. Citro, T. Giamarchi, A. M. Läuchli, D. Biner, K. Krämer, F. Wolff-Fabris, V. Zapf, M. Jaime, J. Stahn, N.B. Christensen, B. Grenier, D.F. McMorrow, and J. Mesot,  
*Transition from a Spin Luttinger-Liquid to a Bose-Einstein Condensate of Magnons in the Quantum Spin Ladder  $(C_5H_{12}N)_2CuBr_4$ ,*  
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- [36] C. Weber, A. Läuchli, F. Mila, and T. Giamarchi,  
*Orbital currents in extended Hubbard models of high-Tc cuprates,*  
Phys. Rev. Lett. **102**, 017005 (2009).
- [35] K.P. Schmidt, J. Dorier, and A. Läuchli,  
*Solids and supersolids of three-body interacting polar molecules in an optical lattice,*  
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- [34] A. Läuchli, and C. Kollath,  
*Spreading of correlations and entanglement after a quench in the Bose-Hubbard model,*  
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- [33] W.F. Tsai, H. Yao, A. Läuchli, and S.A. Kivelson,  
*The Optimal Inhomogeneity for Superconductivity: Finite Size Studies,*  
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- [30] K.P. Schmidt, J. Dorier, A. Läuchli, and F. Mila,  
*Supersolid phase induced by correlated hopping in spin-1/2 frustrated quantum magnets,*  
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*A 2D quantum antiferromagnet with a four-fold degenerate valence-bond-solid ground state,*  
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*Dynamical dimer correlations at bipartite and non-bipartite Rokhsar-Kivelson points,*  
J. Stat. Mech. (2008) P01010.
- [27] G. J. Nilsen, H.M. Ronnow, A. Läuchli, F.P.A Fabbiani, J. Sanchez-Benitez, K.V. Kamenev, A. Harrison,  
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*Spontaneous trimerization in a bilinear-biquadratic  $S=1$  zig-zag chain,*  
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*Spatial noise correlations of a chain of ultracold fermions - A numerical study,*  
Phys. Rev. A **76**, 043614 (2007).
- [24] A. Läuchli, S. Dommange, B. Normand, and F. Mila,  
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- [23] C. Kollath, A. Läuchli, and E. Altman,  
*Quench dynamics and non-equilibrium phase diagram of the Bose-Hubbard model*,  
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- [21] K.P. Schmidt, J. Dorier, A. Läuchli, and F. Mila,  
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*Spin nematic correlations in bilinear-biquadratic  $S=1$  spin chains*,  
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- [19] M. Mambrini, A. Läuchli, D. Poilblanc, and F. Mila,  
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Phys. Rev. B. **73**, 060403(R) (2006).
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